

REMARKS

In accordance with the foregoing, the specification has been amended. Claims 1-54 are pending in the subject application. No new matter is being presented, and approval and entry are respectfully requested.

SUBMISSION OF EVIDENCE TO ASSIST UNDERSTANDING

As a courtesy to the Examiner, the Applicant submits the following EXHIBIT as an aid to better understanding, as follows:

EXHIBIT A: Selected pages from exemplary standard TIA/EIA-98-C, set forth in section [0026] of the application as filed.

REJECTION UNDER 35 U.S.C. § 102

Claim 1 stands rejected under 35 U.S.C. § 102(e) as being anticipated by Kubo et al. U.S. Patent No. 6,249,682. In view of the remarks set forth below, the outstanding anticipation rejection is respectfully traversed.

1. Kubo et al. receives TPC information on a Forward Traffic Channel

FIG. 4 of Kubo et al. illustrates generation of a TPC Command in the receiving side of a mobile station. FIG. 5 of Kubo et al. illustrates transmission of the TPC Command from the receiving side to the transmitting side in the mobile station. In other words, the TPC Command is *internal* to the mobile station and is generally used by the transmitting side to control transmit power of the mobile station. Thus, in FIG. 4 of Kubo et al. (which is a DS-CDMA system) the information needed to form the TPC Command is obtained from antenna 191. The TPC Command, which is *internal* to the mobile station, has a value of "+1" to increase mobile station transmission power, and a value of "-1" to decrease mobile station transmission power. See col. 6, ln. 50-52.

Channels are used by Kubo et al. to transmit data. In the Kubo et al. DS-CDMA system, "on the transmitting side data signals are transmitted with the spread spectrum by using the same frequency for a plurality of *channels* and multiplying the data signals by an independent spread code with a broad band for *each channel*, and on the receiving side the data signals for *each channel* are restored by multiplying received signals by the same spread code." See col. 1, ln. 21-28. The allocation of data in the DS-CDMA channels of Kubo et al. are set forth by, e.g., standard TIA/EIA-98-C.

The Forward CDMA Channel (i.e. the from the base station to the mobile station) has four separate types of channels, namely: the Pilot Channel, Sync Channel, Paging Channels, and Traffic Channels. See EXHIBIT A, page 1-3, ln. 35. However, the base station must control the power of each mobile station *individually* in order to address the distance from the base station (i.e. near-far problem) and to address instantaneous fluctuation (i.e. fading) due to multi-path. See Kubo et al. at col. 1, ln. 35-40. The standard TIA/EIA-98-C provides for individualized power control by transmission of a Power Control Bit as follows:

Power Control Bit. A bit sent in every 1.25 ms interval on the *Forward Traffic Channel* that signals the mobile station to increase or decrease its transmitted power. See EXHIBIT A, page 1-6, ln. 11-12.

This Power Control Bit once received at the mobile station becomes the internal Kubo et al. TPC Command (i.e. either "+1" or "-1"). Of course, it makes sense that the Power Control Bit is on the *Forward Traffic Channel* because, as set forth above, each mobile station receives individual power control information from the base station.

The Kubo et al. receiving station receives its TPC Command information from a Forward Traffic Channel and *not* from the Forward Pilot Channel. Thus, because moving average filter 243 receives information from the traffic channel it does not operate as a pilot filter, and teaches away from operation as a pilot filter by using traffic channel data.

2. Kubo et al. does not teach Pilot Filter Coefficients

Claim 1 sets forth "determining one or more *coefficients* of the pilot filter based on the determined velocity of the wireless communication device."

The Office Action alleges that in FIG. 10 and col. 7, ln. 9-31 of Kubo et al. the "moving average filter" 243 teaches the above claimed determining operation. In view of the explanation set forth above and the further remarks below, the Applicant respectfully traverses.

In short, the Kubo moving average filter 243 simply *does not* have coefficients. However, this makes sense. The purpose of the Kubo et al. is to *correlate* changes in the TPC Command to estimate speed of the mobile receiver. In other words, the base station requests changes to mobile station transmit power (by way of the Power Control Bit, i.e. TPC Commands) based upon distance. The distance changes per unit time as the mobile station

becomes closer or farther away from the base station. Thus, Kubo et al. correlates changes in the TPC Commands to mobile station speed.

TPC Commands are transmitted too fast for direct speed measurement. As set forth in EXHIBIT B, page 1-6, ln. 11-12, a Power Control Bit is sent every 1.25 ms. Thus in Kubo et al., a TPC Command can change $1000/1.25 = 800$ times per second. In order to *slow down* all of this data to determine a speed of the mobile receiver, Kubo et al. calculates an *average value* of the TPC Commands over a period of time.

TPC Commands are accumulated by Kubo et al. to determine the average value. Turning now to FIG. 10 of Kubo et al., moving average filter 243 adds together a series of *time delayed* TPC Commands. But, the TPC Commands can only be +1 or -1. See col. 6, ln. 52. Thus, FIG. 10 uses delay circuit 241 and EX_NOR gate 242 to only output a logic "1" to filter 243 when the TPC Commands steadily increase or decrease, or a logic "0" when the TPC Commands oscillate. See col. 7, ln. 15-23. Thus, moving average filter 243 will *only* "accumulate" when the TPC Commands are continually increasing ("1") indicating that the mobile station is moving away or continually decreasing ("-1") indicating that the mobile station is moving closer.

Coefficients *can not* be added to moving average filter 243. If coefficients were added to moving average filter 243, this would *destroy* the accumulated speed information by changing the stored accumulated value.

In other words, the moving average filter 243 of Kubo et al. teaches away from determining one or more coefficients of the pilot filter as claimed in claim 1.

3. Kubo et al. does not input speed data into moving average filter 243

Further, the estimated value (i.e. the determined speed data) is the *output* from FIG. 10 of Kubo et al. (and likewise from FIG. 11, FIG. 15, and FIG. 17), and does not loop in any way to control the operation of moving average filter 243.

On the other hand, claim 1 particularly sets forth "determining one or more coefficients of the pilot filter based on *the determined* velocity of the wireless communication device."

Accordingly, Kubo et al. fails to teach every claimed element of claim 1, as required by 35 U.S.C. § 102(e) and M.P.E.P. § 2131. Moreover, Kubo et al. fails to suggest, and even teaches away from every claimed element, as required by 35 U.S.C. § 103(a) and M.P.E.P. § 2143.

Reconsideration and withdrawal of the outstanding anticipation rejection as applied to claim 1 is respectfully requested.

REJECTION UNDER 35 U.S.C. § 103

Claims 2-9, 20 and 30 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kubo et al. in view of Akiyama, U.S. Patent No. 6,907,026.

Claims 10-12, 15-19, 21, 24-29, 31, 36-38, 40-42, 44-46, and 49-54 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kubo et al. in view of Akiyama, and further in view of Corbett et al., U.S. Patent No. 6,351,642.

Claims 35, 39, and 43 stand rejected under 35 U.S.C. § 103(a) as being obvious over Akiyama in view of Corbett et al.

Claims 13-14, 22-23, 32-34, and 47-48, 50-54 stand rejected under 35 U.S.C. § 103(a) as being obvious over Kubo et al. in view of Agazzi et al., U.S. Pub. No. 2001/0000219.

The outstanding obviousness rejection is respectfully traversed.

1. Akiyama, U.S. Patent No. 6,907,026

The Office Action at page 4, relies upon Akiyama, FIG. 6, and col. 4, ln. 36-51, col. 11, ln. 37-67, and col. 12, ln. 1-35 as teaching "one or more coefficients are performed in the wireless communication device/network infrastructure." In particular, the Office Action relies upon the Akiyama second embodiment illustrated in FIG. 6 and generally discussed at col. 11, ln. 56.

By way of review, Akiyama relates to a receiving apparatus for a signal transmission system of an Orthogonal Frequency Division Multiplexing ("OFDM") type. Akiyama recognizes that when the OFDM type signal is transmitted by radio wave from a vehicle moving at a high speed, rotation vibration occurs in the phase angle of the SP carriers arranged in the time direction on the reception side due to Doppler fading. See col. 4, ln. 35-42. In other words, the Doppler phenomenon produces high-frequency components when the mobile station is traveling at high speed. Thus, noise reduction LPF 14 -- which is a "low pass filter" -- is provided to filter out the high frequency components. See col. 11, ln. 37-43. The structure of noise reduction LPF 14 is the same as that of the time-axis direction interpolation circuit 10 of FIG. 2. See col. 11, ln. 59-61. Two sets of coefficients, namely narrow bandwidth coefficients (fixed condition or low speed) from coefficient memory 15 or slightly wide bandwidth (high speed) coefficients from coefficient memory 16 may be provided to LPF 14. See col. 12, ln. 5-17.

However, "[t]he *Operator* can control to turn on and off a switch 17a by the control circuit 18 by means of the operation unit 17, so that the received pilot signals CP are supplied to the frequency-direction interpolation circuit 8 through the noise reduction LPF 14 or directly without passing through the noise reduction LPF 14." See col. 11, ln. 66 to col. 12, ln. 4. This is a *manual operation*. Control circuit 18 is "for controlling the delay time of the delay circuit 7." See col. 12, ln. 63-67. Likewise, even in the first embodiment of Akiyama, "... *the operator selects* the first coefficient memory 11 by means of the operation unit 13" See col. 10, ln. 13-23.

On the other hand, the claims specify coefficient of the pilot filter be based on the velocity of the device." The present Application teaches how the bandwidth of a pilot filter may be varied with velocity to provide improved performance (Original Application, p. 13, ¶¶ [0052]-[0053]). The Application teaches how the output of the velocity estimator 426 is input into the coefficient selector unit 428 (*Id.*, p. 16, ¶ [0061]). The "coefficient selector unit 428 evaluates the ... estimate of the WCD velocity and determines the desired set of coefficients" (*Id.*). Thus, the **coefficients** of the subject pilot filter are based on the **velocity** of the device, as claimed.

Using the Akiyama *manual switch* that is selectable by *an operator* clearly falls short of determining the coefficients of a pilot filter based on velocity. While Akiyama recognizes that a speed greater than 25 km per hour produces an effect on the SP carrier, Akiyama relies upon the Operator to flip the switch. (This is actually farther a field than the withdrawn reference of Tkanashi et al cited in the O.A. of June 6, 2005). Thus, Akiyama does not teach the limitations of the present claims, alone or in combination with Kubo et al.

1a. No combination of Akiyama with Kubo et al.

Moreover, the OFDM pilot signals of Akiyama are completely incompatible with CDMA pilot signals of Kubo et al., as both relate to separate technology. CDMA pilot signals are despread and then decoded with a channelization code, such as a Walsh code (for e.g. IS-95, cdma2000, etc.) or an OVSF code (for e.g., W-CDMA). See Application at pg. 11, ¶ [0046]. On the other hand, the Akiyama OFDM system has approximately 1,400 carriers. See Akiyama at col. 1, ln. 42. Thus, the OFDM pilot signals are scattered both in the frequency direction and the time direction to form a scattered pilot signal "SP". See Akiyama at col. 2, ln. 15-18, and as illustrated in FIG. 7, FIG. 8.

Thus, the technology of Akiyama can not be combined with Kubo et al. in accordance with the principals of 35 U.S.C. § 103.

Reconsideration and withdrawal of the outstanding obviousness rejection over a combination of Akiyama and Kubo et al. is respectfully requested.

2. Kubo et al., Akiyama, and Corbett et al., U.S. Patent No. 6,351,642.

As stated above, Kubo and Akiyama do not disclose or teach Claim 1. Corbett, alone or in combination with Kubo and Akiyama, also fails to teach Claim 1 because Corbett does not disclose a “pilot filter” or a “method of adapting a pilot filter,” as recited in Claim 1. In particular, and as set forth above, Corbett fails to teach or suggest the features of determining one or more coefficients of the pilot filter *based on the determined velocity* of the wireless communication device. Corbett fails to disclose any means, what so ever, to work with the Akiyama OFDM manual operation unit switch, and fails to disclose any means for coefficient determination based on velocity. Claim 1 therefore defines over the combination of references. Claims 10-12, 15 and 50-53 depend on Claim 1 and are therefore allowable.

As stated above, Kubo and Akiyama do not disclose or teach Claim 16. Corbett also fails to teach the claimed controller the determines coefficients and adapts a pilot filter. Akiyama does not have a controller – Akiyama has a manual switch! The use of a manual switch by Akiyama *teaches away* from use of a controller. Thus, Claims 16-19, 21 and 54 are therefore allowable.

As stated above, Kubo and Akiyama do not disclose or teach Claim 24. Akiyama uses a switch, not a controller. There is simply no selection of pilot filter outputs based on velocity from Kubo, Akiyama, or Corbett. Thus, the references fail to teach the claimed “pilot filters” and “controller” of Claim 24. Thus, Claims 24-29 and 31 are therefore allowable.

Claims 35, 39 and 43 fail to recite the claimed pilot filter and infrastructure device. There is simply no teaching of the claimed pilot filter coefficients being transmitted from the infrastructure. As stated above, Kubo, Akiyama and Corbett do not disclose or teach the claimed “pilot filter”. Claims 35, 39 and 43, and the claims depending therefore are therefore allowable.

Reconsideration and withdrawal of the obviousness rejection over Kubo et al., Akiyama, and Corbett et al. is respectfully requested.

3. Akiyama in view of Corbett et al.

Claims 35, 39, and 43 stand rejected under 35 U.S.C. §103(a) as being obvious over Akiyama in view of Corbett et al.

Akiyama relates to OFDM technology and Corbett et al. relates to CDMA technology, wherein the incompatibility of same as applied to the subject claims is as discussed in greater detail above.

As stated above, Akiyama and Corbett do not teach the claimed pilot filter or the claimed infrastructure of Claims 35, 39, and 43. The Office Action cites col. 7, lines 9-31 of Akiyama and col. 4, lines 1-67 of Corbett, but these lines do not teach the “pilot filter” of Claims 35, 39, and 43. In fact, col. 4, ln. 1-27 of Corbett simply teach the standard scanning for pilot channels, such as set forth by TIA/EIA-98-C, as discussed in greater detail above. In other words, all mobile stations operating under the 98-C standard search for a CDMA pilot signal on the Forward Traffic Channel. Corbett does calculate velocity (col. 4, ln. 67), however there is simply no means, what-so-ever, that would relate the Corbett velocity information from a CDMA system to the *manual OFDM operation switch* of Akiyama. Said differently, there is simply no means in either Corbett or Akiyama to select OFDM pilot signal coefficients based upon CDMA soft handoff velocity information. Moreover, there simply is no teaching of the claimed infrastructure of claims 35, 39, and 43, because there is no teaching that the OFDM infrastructure may be used by CDMA infrastructure, let alone to determine pilot filter coefficients as claimed. Further, Akiyama teaches the use of a manual switch to control velocity problems in OFDM.

Claims 35, 39, and 43 are therefore allowable because the pilot filter is configured to accept coefficients from the infrastructure, whereas Akiyama teaches that the coefficients are from the mobile device that is manually selected using a switch.

4. Kubo et al. in view of Agazzi et al.

The Office Action rejected claims 13-14, 22-23, 32-34, 47-48, and 50-54 under 35 U.S.C. 103(a) as being unpatentable over Kubo et al. (U.S. 6,249,682) in view of Agazzi et al. (Pub. No. 2001/0000219).

Agazzi et al. is relied upon in the Office Action at page 11, as teaching a finite/infinite impulse response filter (Paragraph [0006], [0066-0070]).

In short, Agazzi et al. sets forth that: "The precursor filter 28 is a *non-adaptive filter*." See Agazzi et al. at [0066], and at FIG. 2.

Claim 1 (base claim for claims 13-14, 50-53) sets for "A method of *adapting* a pilot filter ..."

Claim 16 (base claim for 22-23, 54) sets forth "a controller that ... *adapts* the pilot filter...."

Claim 24 (base claim for 32-34) sets forth "a controller configured to *select* one of the plurality of filter outputs based on the *wireless* communication device velocity." Agazzi relates to 10BASE-T implementation of Ethernet, and fails to teach any pilot filter, what-so-ever, because Agazzi et al. relates to LAN technology. In short, LAN devices simply do not have a significant velocity due to their wired connection.

Claim 43 (base claim for 47-48) sets forth "an infrastructure device ... to accept coefficients that *adapt* the response of the filter..."

The Agazzi et al. filter teaches away from the claimed adaption, and teaches away from selection based on wireless device velocity.

Reconsideration and withdrawal of all outstanding obviousness rejections are respectfully requested.

CONCLUSION

In light of the amendments and remarks set forth above, Applicants respectfully submit that the application is in condition for allowance, which action is earnestly solicited.

The Commissioner is hereby authorized to charge any fees which may be required to Deposit Account No. 17-0026 in the name of QUALCOMM, Incorporated.

Respectfully submitted,

Dated: December 14, 2006

/Todd M. Marlette/
Todd M. Marlette, Reg. No. 35,269
Phone: (858) 651-7985

QUALCOMM Incorporated
Attn: Patent Department
5775 Morehouse Drive
San Diego, California 92121
Telephone: (858) 845-4265
Facsimile: (858) 658-2502

TIA/EIA STANDARD

Recommended Minimum Performance Standards for Dual-Mode Spread Spectrum Mobile Stations

TIA/EIA-98-C

(Revision of TIA/EIA-98-B)

NOVEMBER 1999

TELECOMMUNICATIONS INDUSTRY ASSOCIATION



Representing the telecommunications industry in
association with the Electronic Industries Alliance



Code Division Multiple Access (CDMA). A technique for spread-spectrum multiple-access digital communications that creates channels through the use of unique code sequences.

CRC. See Cyclic Redundancy Code.

Cyclic Redundancy Code (CRC). A class of linear error detecting codes which generate parity check bits by finding the remainder of a polynomial division.

dBc. The ratio (in dB) of the sideband power of a signal, measured in a given bandwidth at a given frequency offset from the center frequency of the same signal, to the total inband power of the signal. For CDMA, the total inband power of the signal is measured in a 1.23 MHz bandwidth around the center frequency of the CDMA signal.

dBm. A measure of power expressed in terms of its ratio (in dB) to one milliwatt.

dBm/Hz. A measure of power spectral density. The ratio, dBm/Hz, is the power in one Hertz of bandwidth, where power is expressed in units of dBm.

dBW. A measure of power expressed in terms of its ratio (in dB) to one watt.

E_b . Average energy per information bit for the Sync Channel, Paging Channel, or Forward Traffic Channel at the mobile station antenna connector.

$\frac{E_b}{N_t}$. The ratio of the combined received energy per bit to the effective noise power spectral density for the Sync Channel, Paging Channel, or Forward Traffic Channel at the mobile station antenna connector (see 1.4).

E_c . Average energy per PN chip for the Pilot Channel, Sync Channel, Paging Channel, Forward Traffic Channel, power control subchannel, or OCNS.

$\frac{E_c}{I_{or}}$. The ratio of the average transmit energy per PN chip for the Pilot Channel, Sync Channel, Paging Channel, Forward Traffic Channel, power control subchannel, or OCNS to the total transmit power spectral density.

Effective Isotropic Radiated Power (EIRP). The product of the power supplied to the antenna and the antenna gain in a direction relative to an isotropic antenna.

Effective Radiated Power (ERP). The product of the power supplied to the antenna and the antenna gain relative to a half-wave dipole in a given direction.

EIRP. See Effective Isotropic Radiated Power.

ERP. See Effective Radiated Power.

FER. Frame Error Rate of Forward Traffic Channel. The value of FER may be estimated by using Service Option 2, 9, 30, or 31 (see TIA/EIA-125-C).

Forward CDMA Channel. A CDMA Channel from a base station to mobile stations. The Forward CDMA Channel contains one or more code channels that are transmitted on a CDMA frequency assignment using a particular pilot PN offset. The code channels are associated with the Pilot Channel, Sync Channel, Paging Channels, and Traffic Channels. The Forward CDMA Channel always carries a Pilot Channel and can carry one Sync

Channel, up to seven Paging Channels, and up to 63 Traffic Channels, as long as the total number of channels, including the Pilot Channel, is no greater than 64.

Forward Fundamental Channel. A portion of a Forward Traffic Channel which carries a combination of higher-level data and power control information.

Forward Supplemental Code Channel. A portion of a Forward Traffic Channel which operates in conjunction with a Forward Fundamental Channel in that Forward Traffic Channel, and (optionally) with other Forward Supplemental Code Channels to provide higher data rate services, and on which higher-level data is transmitted.

Forward Traffic Channel. A code channel used to transport user and signaling traffic from a base station to a mobile station.

Frame. A basic timing interval in the system. For the Access Channel, Paging Channel, and Traffic Channel, a frame is 20 ms long. For the Sync Channel, a frame is 26.666... ms long.

Frame Quality Indicator. The CRC check applied to the 9600 bps and 4800 bps frames of Rate Set 1 and all frames of Rate Set 2.

Good Frames. Frames not classified as bad frames. See also Bad Frames.

Good Message. A received message is declared a good message if it is received with a correct CRC.

Handoff. The act of transferring communication with a mobile station from one base station to another.

Hard Handoff. A handoff characterized by a temporary disconnection of the Traffic Channel. Hard handoffs occur when the mobile station is transferred between disjoint Active Sets, the CDMA frequency assignment changes, the frame offset changes, or the mobile station is directed from a CDMA Traffic Channel to an analog voice channel. See also Soft Handoff.

I_0 . The total received power spectral density, including signal and interference, as measured at the mobile station antenna connector.

I_{oc} . The power spectral density of a band-limited white noise source (simulating interference from other cells) as measured at the mobile station antenna connector.

I_{of} . The total transmit power spectral density of the Forward CDMA Channel at the base station antenna connector.

\hat{I}_{of} . The received power spectral density of the Forward CDMA Channel as measured at the mobile station antenna connector.

MER. Message Error Rate. $MER = 1 - \frac{\text{Number of good messages received}}{\text{Number of messages transmitted}}$

Mobile Station. A station intended to be used while in motion or during halts at unspecified points. Mobile stations include portable units (e.g., hand-held personal units) and units installed in vehicles.

Mobile Switching Center (MSC). A configuration of equipment that provides cellular radiotelephone service. Also called the Mobile Telephone Switching Office (MTSO).

Pilot E_c . $\frac{E_c}{I_{or}}$. The ratio of the average transmit energy per PN chip for the Pilot Channel to the

total transmit power spectral density.

Pilot Channel. An unmodulated, direct-sequence spread spectrum signal transmitted continuously by each CDMA base station. The Pilot Channel allows a mobile station to acquire the timing of the Forward CDMA Channel, provides a phase reference for coherent demodulation, and provides a means for signal strength comparisons between base stations for determining when to handoff.

Pilot PN Sequence. A pair of modified maximal length PN sequences with period 2^{15} PN chips used to spread the Forward CDMA Channel and the Reverse CDMA Channel. Different base stations are identified by different pilot PN sequence offsets.

Power Control Bit. A bit sent in every 1.25 ms interval on the Forward Traffic Channel that signals the mobile station to increase or decrease its transmit power.

Power Control E_c . Average energy per PN chip for the power control subchannel. For the case when the power control sub-channel is assumed to be transmitted at the same power level that is used for the 9600 bps or 14400 bps data rate, the following equations apply:

For Rate Set 1, it is equal to $\frac{v}{11+v} \times$ (total Forward Traffic Channel energy per PN chip),

where v equals 1 for 9600 bps, v equals 2 for 4800 bps, v equals 4 for 2400 bps, and v equals 8 for 1200 bps traffic data rate. For Rate Set 2, it is equal to $\frac{v}{23+v} \times$ (total Forward

Traffic Channel energy per PN chip), where v equals 1 for 14400 bps, v equals 2 for 7200 bps, v equals 4 for 3600 bps, and v equals 8 for 1800 bps traffic data rate. The total Forward Traffic Channel is comprised of traffic data and a power control sub-channel.

Power Control E_c . $\frac{E_c}{I_{or}}$. The ratio of the average transmit energy per PN chip for the power

control subchannel to the total transmit power spectral density.

Power Control Group. A 1.25 ms interval on the Forward Traffic Channel and the Reverse Traffic Channel. See also Power Control Bit.

ppm. Parts per million.

PS. Pilot Strength. Also see Pilot E_c/I_o .

Rate Set. A set of Traffic Channel transmission formats that are characterized by physical layer parameters such as transmission rates, modulation characteristics, and error correcting coding schemes.

Reverse CDMA Channel. The CDMA Channel from the mobile station to the base station. From the base station's perspective, the Reverse CDMA Channel is the sum of all mobile station transmissions on a CDMA frequency assignment.

Reverse Traffic Channel. A Reverse CDMA Channel used to transport user and signaling traffic from a single mobile station to one or more base stations.